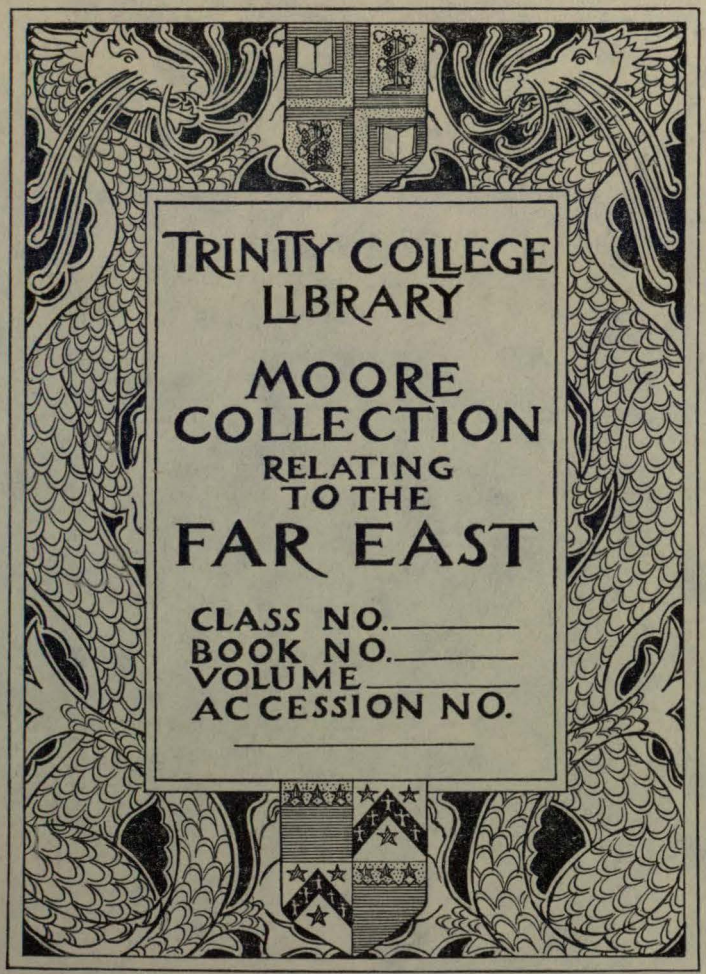

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CANTON CHRISTIAN COLLEGE

BULLETIN No. 25

LAWN GRASSES FOR SOUTH CHINA

BY

H. B. GRAYBILL, M. A.

CANTON, CHINA

1920

Letter of Transmittal

CANTON, CHINA, December 30, 1919.

Dear Mr. Duncan:

I submit herewith and recommend for publication Mr. H. B. Graybill's paper on *Lawn Grasses for South China*, as one of the agricultural bulletins of the College.

During recent years there has been manifested by both Chinese and westerners a great interest in the acquisition of good lawns under our southern China conditions. The average beginner wishes to establish a lawn by securing from the West seed of some of the delicate lawn grasses he has seen growing so well under northern conditions. All experience disfavors this procedure. Mr. Graybill, in his paper, has pointed to native grasses, the use of which should guarantee an attractive lawn. His descriptions and the illustrations should enable the lawn-maker in South China to acquire in the wild suitable grasses for planting his lawn.

This paper should not only interest the resident of South China; it should be of interest in any sub-tropical or tropical country. In this connection the most important fact brought out by this paper is the value of *Eremochloa* as lawn grass. To the best of our knowledge the lawn possibilities of *Eremochloa ciliaris (Linn.) Merr.* have never before been strongly emphasized or even mentioned in print. Under sub-tropical conditions the lawn problem has ever been a difficult one and Mr. Graybill's paper may point the way to a grass that will be an exceedingly desirable introduction to other countries where climatic conditions are very similar to those here in southern China. Prof. E. D. Merrill or the Bureau of Science in Manila has written to us that the reason this species has not previously been considered as a lawn grass is probably due to its comparatively restricted range which, as at present reported, is Burma, Indo-China, southern China Formosa and northern Luzon. On the other hand the introduction, of *Andropogon aciculatus Retz.*, known by the Cantonese as Chuk tsit ts'o (竹節草) or Sik tsut ts'o (蟋蟀草) into other countries should be greatly discouraged because of its many objectionable characters as pointed out in this paper.

Experiments with *Ermocehloa* should be carried further and its adaptability tested over a wider range than we have given it here at the college. Our own areas planted to pure *Eremochloa* are still very meager and we should plant it more widely so as to get more accurate data as to its soil adaptability, drought resisiance and ability to stand in competition with other grassss. An attempt should be made to produce seed of this grass, as considerable experience is necessary to enable an amateur to pick it out from the many other grasses growing here.

Mr. Graybill's paper should have a wide distribution both in South China and abroad because of its significance to the successful acquisition of lawns under trying southern conditions.

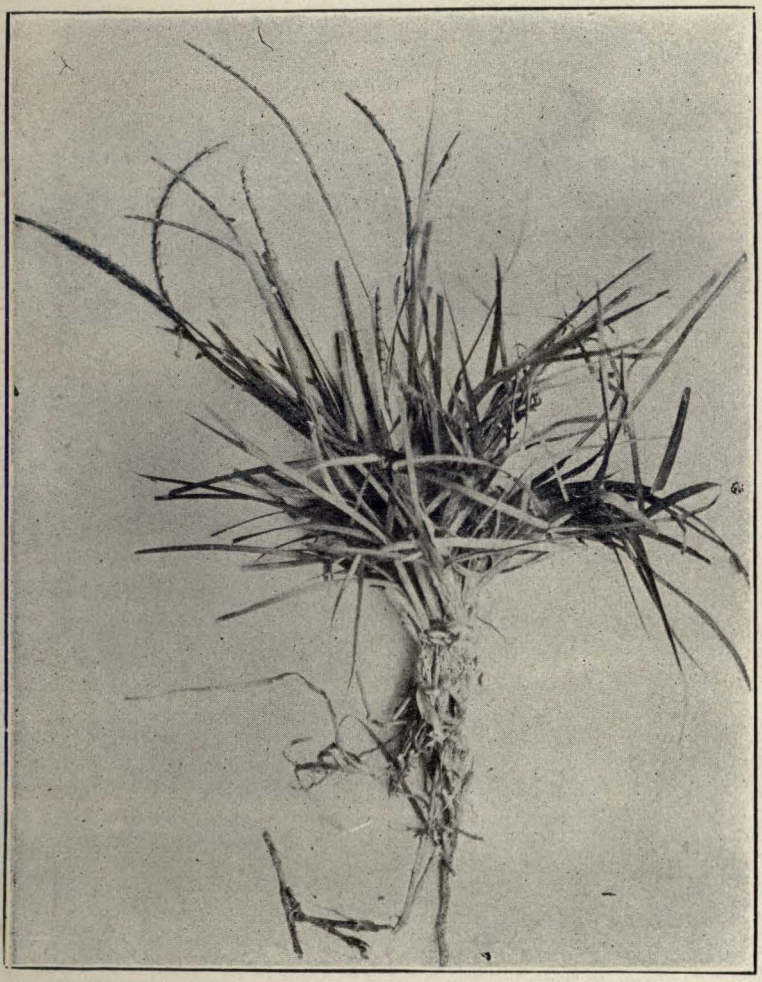
MR. KENNETH DUNCAN, Dean,
College of Arts and Sciences.

Respectfully submitted,
G. WEIDMAN GROFF
Director of Agricultural Work



ANDROPOGON ACICULATUS RETZ.

This is the most common grass on lawns in Hongkong and on Shameen as well as in most closely-cropped grazing ground. A well-rolled lawn cut close is almost sure to give *Andropogon*. A gardener finding that it stands his treatment best, naturally favors it and proceeds to root out all others. The seeds grow upon a flower stalk six inches to a foot in height and are the "stickers" that constitute a great objection to a ramble through the fields.



EREMOCHLOA CILIARIS (LINN.) MERR.

EREMOCHLOA LEERSIOIDES HACK.

This is the second most common lawn grass in South China and the one recommended in this bulletin. Its natural height is three to four inches and it does not thrive under close cutting.

Lawn Grasses for South China

by

H. B. GRAYBILL, M. A.

Beautiful lawns may be had in South China with little difficulty. It is often taken for granted that a fine lawn is not to be expected in hot climates. Even in the southern part of the United States the best lawn grass will not last over the winter months but must have a substitute sown to tide over the time when it dies out. In South China, however, there are several lawn grasses that give fairly permanent grass covering for hill and plain, and three of these are commonly used for lawns.

The fact that these grasses are native makes it easy to cultivate them. There is not a school yard, a residence plot, an unoccupied town lot, an open space in city or village that could not be made a neat, clean, green floor for outdoor life and play. If you own a house and lot, make the ground around your home a lawn. That is a mark of civilization. It is also a place for enjoyment, for health-giving exercise, and an attraction to every passer-by.

Especially should grassy lawns appeal to schools. Do not make all the school ground into bare ball courts. Cultivate upon the larger part of it a fine permanent grass. The students themselves can do it, and will take pride in it, and will enjoy it as a place for meetings and sports.

One of the reasons these things are not self-evident and always convincing, is that perfect lawns are so uncommon. The purpose of this paper is to show why this is true, to point out the difficulties that make for failure and the roads to success in developing perfect lawns. Our experience at the Canton Christian College has not been very long and our observations are not altogether province-wide, but we submit our conclusions for what they are worth and promise to be the most ready and grateful of all to receive corrections and further suggestions

There are about a hundred grasses growing on the campus at the College. These correspond closely with the commoner grasses all over the province, as our herbarium collections show. The first question is how to select from among these the best grass or grasses for a lawn.

If a piece of cultivated ground is left idle it will grow up first in weeds with some grass and finally in grass alone, or at least is likely to do so. Weeds are quickest to start, but when they die after a short life-period, their place is taken by the more patient grass. Ultimately, after years, trees may finish the job. The principle of selection in each stage is the ability to get sunlight. The weeds get it first and hold back the grasses, unless for some reason the grasses get the start. Then when the grasses secure the ground there takes place the same

fight for sunlight. This gives the advantage to the taller grasses, and so in a short time the ground is grown up in tall grass.

To secure a lawn, therefore, man must take a hand in the struggle and give the advantage to the short lawn grass. This he does with a lawnmower. In other words you may put your lawnmower on a piece of wild ground covered with coarse mountain grass, as I have done, and reduce the plot without any planting to a fairly good lawn. The tall grasses being cut down, and yet dependent upon their tall blades and stalks for life, surrender, and the short grasses take their place, for their seeds are very likely to be present except in the center of a city. The same thing occurs when cattle eat the grass back, or even when traffic is sufficient to destroy the taller grasses but not heavy enough to kill the shorter and softer lawn grasses. You can, therefore, find the lawn grasses which we shall discuss in almost any grassy field that is not grown up in tall grass.

The lawnmower is, therefore, the determining factor in the development of a lawn in this region. There must be the right seed or sod to begin with, but these are often present or easily gotten. There must be fairly good soil, but grass will with the aid of earthworms make a soil if it has a chance. Water, of course, is necessary and usually is not lacking. The lawnmower finally determines the character of the lawn more than any other factor. If the lawnmower cuts high, you will have a high grass. If it cuts to within a quarter of an inch of the ground, as most British lawnmowers that I have seen do, you will get the one or two grasses which alone can stand that close cutting. If you cut by hand in the usual irregular and pulling-out way, you will at last have the grasses which are best able to stand that kind of treatment, perhaps several grasses varying with the cutting.

The most common grass on lawns in Hongkong and on Shameen as well as in most closely-cropped grazing ground near these places, is *Andropogon aciculatus Retz.* (Plate I), because it alone can stand the close cutting and grazing and yet keep the ground covered. A well-rolled lawn cut close—to within a quarter or half inch—is almost sure to give *Andropogon.* A perfectly pure stand of it is found upon the croquet lawn on Shameen, Canton. A gardener finding that it stands his treatment best, naturally favors it and proceeds to root out all others.

The next most common lawn grass in South China in *Eremochloa ciliaris (Linn.) Merr. (Eremochloa leersioides Hack.)* (Plate II), which can live under favorable circumstances in spite of the close cutting, but has a hard time of it. Its natural height is three to four inches, while *Andropogon* flourishes best at one to three inches. The golf links at Fan Ling, Hongkong New Territory, are almost covered with pure *Eremochloa*, but it is suffering from the frequent close cutting. If the care-takers should give it an inch more it would double its beauty and health.



CYNODON DACTYLON PERS.
(CAPRIOLA DACTYLON O. KUNTZE)

This is the third most common lawn grass found in South China. It is commonly called Bermuda grass and is often recommended in the United States for southern latitudes. It adapts itself easily to varying conditions, spreads with great rapidity and stands almost any amount of walking without wearing, but rather seems to profit by it.



No. 1. ANDROPOGON ACICULATUS RETZ.
No. 2. EREMOCHLOA CILIARIS (LINN.) MERR.
(EREMOCHLOA LEERSOIDES HACK.)

Andropogon may be distinguished by the "tooth marks" on every leaf blade. The blades are rather wide, a half-inch to three inches long, rough, wavy, and some are usually dead. At the base of each leaf on the runner there is a clear white ring.

Eremochloa gives the best results if your lawn mower is geared up an inch from the ground. *Eremochloa* seeds are not so common or easy to obtain the seed stalks frequently being found empty.

The third most common grass here is *Cynodon dactylon Pers.* (or *Capriola dactylon O. Kuntze*) (Plate III), commonly called Bermuda grass. This is often recommended in the United States for southern latitudes. It adapts itself easily to varying conditions, spreads with great rapidity, and stands almost any amount of walking without wearing, but rather seems to profit by it. *Cynodon* cannot stand a lawnmower as the others can since its character as a sod depends not upon the blade but upon the whole stalk, which stands up thick but for that reason suffers when the mower passes over and takes the best part of it away. It is commonly seen along roads where the traffic keeps the other grasses down. It is not tall enough to hold its own against the coarse tall grasses, but in turn will choke out *Eremochloa* and *Andropogon*.

In these statements I am disregarding two or three rough wild grasses that are able to with-stand the mower and make a fairly good deep green covering for a time on good ground, but are not really sod grasses of permanent character. They are all saw-edge and hairy, holding the glistening dew in the morning as though to attract attention to themselves.

Of these three grasses the best is *Eremochloa*, according to our experiments and observations. The reasons will appear in the following descriptions. All of them may be started from sod or from planting the runners. *Andropogon's* seeds are everywhere. *Cynodon* seeds may be easily gathered. But *Eremochloa* seeds are not so common or easy to obtain, the seed stalks frequently being found empty. All are easily propogated, but *Eremochloa* gives the best results if your lawnmower is geared up an inch from the ground, or better still if you devote the time to eradicating other grasses and do not cut at all. Since the grass is not high it need not be cut except for tennis or bowling. It would be best not to cut it at all.

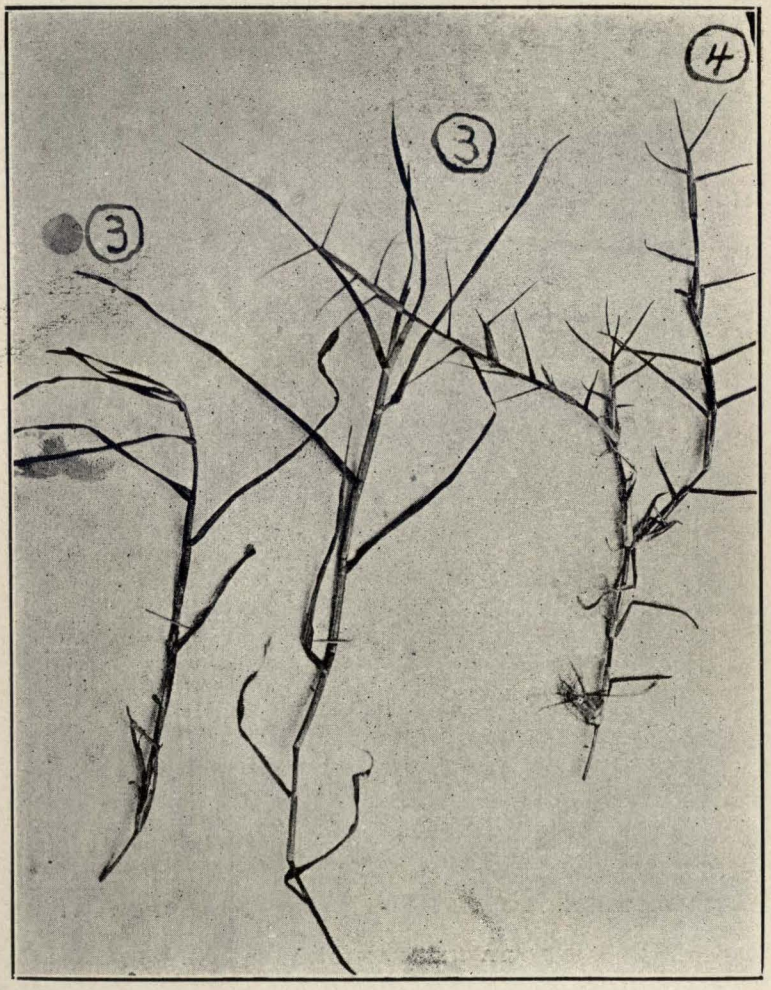
Andropogon may be distinguished by the "tooth-marks" on every leaf-blade, as though someone had bitten across it once to four times. Or pull up a runner and compare it with the illustration in Plate IV (No. 1). The blades are rather wide, a half-inch to three inches long, rough, wavy, and usually some are dead. The runner has a rather thick stalk, hugs the ground tight, and at the edge of the path or bare ground runs far out searching for a new foothold. At the base of each leaf on the runner there is a clear white ring. The seeds grow upon a flower stalk six inches to a foot in height and are the "stickers" that constitute a great objection to a ramble through the fields with your nice stockings and trousers (or skirts) on. If you want *Andropogon* seeds you may secure them by taking a walk and then returning to pick out the stickers. On a close-cropped lawn these may be absent and even unknown to the owner, but let the lawnmower be stopped for a week or two and there they are. These "stickers" and the fact that *Andropogon* shows so much "dead stuff" through the win-

ter months constitute the chief objections to *Andropogon*. In the Philippines, an attempt is usually made to exterminate this grass in lawns as the erect, rather tough flowering stems are frequently not cut by an ordinary lawnmower. Prof. E. D. Merrill, of the Bureau of Science in Manila, informs us that *Andropogon* is very widely distributed in the tropics of the Old World and is generally regarded as a pest on account of its seeds adhering to clothing.

Eremochloa is a smooth grass, almost the only one that has a blade with no roughness or saw-edge of any kind. It is a deep green, contrasting with *Andropogon's* yellow-green and *Cynodon's* grey-green. It maintains this deep green through the winter if it gets a good hold during the summer. That is one of its best recommendations. Its runners are often found along with those of *Andropogon*, but may be easily distinguished. As shown in the illustration Plate IV (No. 2 of grass runners) it pushes out a rather sharp point on a rather slender flat stalk, upon which the blades frequently turn back at an obtuse angle, a distinguishing characteristic of this grass. The blades on the runner are usually, but not always, very short, lengthening as they go back and making a thick smooth sod in the matted part of the grass. The seed stalk is not bush-like as in the case of *Andropogon*, but a single slender stalk with close-lying seeds. It stands only a few inches high, sufficiently insignificant to be allowed to stand without cutting and not injure the appearance or use of the lawn. The seeds are often absent, perhaps destroyed by a blight. *Eremochloa* grows well in even fairly shady places as well as in intense sunlight and stands both wet and dry. It competes well with the hardiest lawn grass in hard clay soil.

Cynodon (Bermuda grass) is a grey grass and does not give the deep green lawn that *Eremochloa* does. Its leaves are short and the stalks themselves must stand up and give the necessary density to make a good lawn. Its runners are more slender than those of *Eremochloa* do not hug the ground always (and so are more easily destroyed), do not show the turned back angle of blade on runner, but give an angle a little less than a right angle and have blades more sharp-pointed and harder than those of *Eremochloa*. (See Plate v, No. 4 for an illustration). Blades are rough-edged. The flower stalk has three to five straight branches standing out from the end of the stalk like a star on a stick. *Cynodon* stands tramping better than cutting or shade. It is hardy and covers ground quickly. It is likely to die out in the winter if it is too cold or dry, but comes in again strongly in the spring. If left alone it will grow several inches high.

These grasses can be easily distinguished by the above descriptions of the runners (see illustrations). There is but one grass that I know that may give difficulty in distinguishing its runners. The runners of *Rottboellia compressa L.* resemble those of *Eremochloa* somewhat, but the two illustrations (Plate v, No. 3) will show that



No. 3. ROTTBOELLIA COMPRESSA, L.F.
No. 4. CYNODON DACTYLON, PERS.
(CAPRIOLA DACTYLON O. KUNTZE)

Rottboellia resembles *Eremochloa* somewhat. *Cynodon* is the so-called "Bermuda grass."



STENATAPHRUM AMERICANUS, SCH.

Stenataphrum in some ways resembles *Eremochloa* closely. It stands higher, however, has rough saw-edges, larger spikes of seeds, and blunter blades than *Eremochloa*. It it used in Florida as a lawn grass.

the runners of the former have longer blades not turned back and have a small white ring at the base of the blade where it stands out from the stem, as *Andropogon* has. The blades of *Rotthoellia* resemble the longer blades of *Eremochloa*, which the latter produces in shade or in thick mass—the same dark green, soft, smooth blades—but *Rottboellia* does not make a good sod.

Eragrostis cilianensis Vig. Lut. has the same general appearance as *Cynodon*, but may be easily distinguished from the latter by its irregularly branched flower stalk. It does not make a good sod.

Lawns in this region, especially in the city and in other rather damp and shaded places, contain many sedges, including some that run like sod grasses. Experiments have shown us that they can be made in favorable circumstances to cover ground fairly well with their shiny green bunchy sod, but we advise that they be eradicated and give place to lawn grass of a more durable nature.

Stenotaphrum (St. Augustine grass, Charleston grass, goose grass) (Plate VI) is found here and in some ways resembles *Eremochloa* closely. It stands higher, however, has rough saw-edges, larger spikes of seeds and blunter blades than *Eremochloa*. It is used in Florida as a lawn grass where its characteristics which resemble those of *Eremochloa*—natural sod-grass height, running and matting together, adaptability to shade and sun, wet and dry, good and bad soil, and unobjectionable seeds—recommend it to the people of that region.

Eremochloa is more nearly a proper height for lawns, has a smooth, soft blade, is more easily found and started, and has more insignificant seed stalks, and we therefore recommend it as the best lawn grass for this climate.

To plant *Eremochloa* (or for that matter any of these grasses with almost as much ease as *Eremochloa*) gather the runners with as much root as convenient, or even with no roots at all, and plant immediately two inches or deeper, leaving the growing end pointing along the ground in the direction you want it to spread. If you plant a large piece of ground plow it up and rake out all the grass so as to give your lawn grass the best chance. Dig little holes or trenches for the runners (or pieces of sod or bunches of grass if you wish—not any quicker or better, however) and plant as thick as you can. The thicker the quicker. Six inches apart, *Eremochloa* runners will cover the ground in two to five months in any but the poorest soil. To sod a lawn one feels a natural impulse to cut up and lay sod taken from the best sodded place he can find. But this has the disadvantage of giving a mixture of grasses and costing a great deal. The soil brought in with the sod is good, but it is better to plant pure *Eremochloa* grass, smooth the ground perfectly, and if you have any money to spend put it into a top dressing of good rich soil (without grass roots) and a little fertilizer.

Having planted the runner it is not necessary to do anthing more (unless the season is very dry, when water will, of coursc, be necessary until the runners root—a little water at the very first is necessary unless it rains immediately after planting) except to keep out the weeds and other grasses, which springing from seeds will grow faster than the lawn grass can spread.

Eremochloa need not be mowed. It is well to roll and work over the ground as often as it begins to get rough from the work of earthworms. But with this grass the labor you would naturally spend upon mowing may be spent upon pulling up or digging out other grasses and weeds. If you do not cut the tall grasses and weeds you must use this method of giving the short lawn grass the advantage. When the ground is damp but not soaking wet go over it and pull out weeds and other grasses. The final result is a stand of this short lawn grass that will hold its own for a long time against all comers and rewards you by maintaining its lawn-like character without your having to cut it. *Andropogon* must be cut on account of the objectionable "stickers" *Cynodon* uncut will grow too deep and uneven to be a good lawn. *Eremochloa* gives a deep green lawn with only a brown tinge when the seeds are ripe, and on the other hand may be cut if desired to within an inch of the ground without the least injury.

Prof. E. D. Merrill of the Bureau of Science of the Philippine Islands upon having this matter called to his attention agreed with us that this *Eremochloa* is the most promising lawn grass for these subtropical regions. We wish also to acknowledge the work Mr. Merrill has done for us in naming these grasses.

We wish finally to call attention to the virtue of a sloping lawn as against a level one. It is a common impulse to begin lawn-making by leveling the ground, as though a plot of ground could not be a beautiful lawn unless it were level. A sloping or rolling lawn, however, is not only better drained and suited to planting grass and shrubs but is in it self more beautiful. A level lawn is more easily cut, but sloping lawns and even terraces can be cut with a lawnmower, and if *Eremochloa* is planted it need not be cut.

We trust that this little bulletin may prove of value and that those who act upon its suggestions will kindly inform us of their results so that corrections may be made and further information sent out.

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